

Full Throttle

The Microsoft® Flight Simulator™ Pilot's Journal

December 1997/January 1998 Vol.4 No.6

Practice sailplane soaring

**Flying an ILS approach
in FS95's 737**

We review Flight Simulator 98

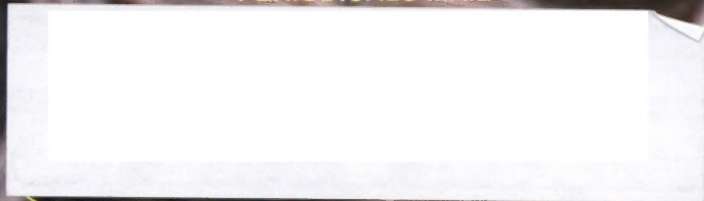
**Cross Country poses
special challenges in the
Seattle area**

**Assigning FS95 sounds to
Windows 95 events**

**We spotlight Web pages
featuring downloadable files**



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Full Throttle

The Microsoft Flight Simulator Pilot's Journal

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Pilot's Note:

All information in Full Throttle is intended for use with Microsoft Flight Simulator (version 5.0 and higher) only. This information is not intended for use in actual flight situations. While the maps, logs and other information are as realistic as possible, you should not use them for actual flying instruction. Safe flying!

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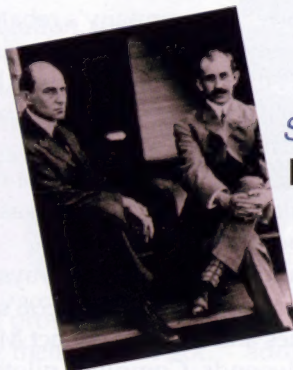
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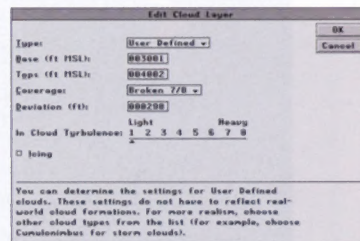
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Cover: This Learjet 35A is on departure. The new Flight Simulator 98 features the state-of-the-art Learjet 45; see review on page 26.

Full Throttle looks back at 1997

With this issue, *Full Throttle* celebrates its fifth anniversary of publication. Earlier this year, Microsoft commemorated the fifteenth year of publishing the most popular flight simulator—indeed, one of the most popular computer games—ever. FS98's release was unquestionably the big news of the year, but it wasn't welcomed by all.

The release of FS98 was heralded with much ballyhoo from Microsoft, which was justifiably excited at the many advances the program represents. It was also met, however, by no small amount of skepticism from some of the Flight Simulator community who post on Usenet (rec.aviation.simulators) and other computerized discussion forums. Many, responding to initial reports of FS98's contents, pointed out elements the program doesn't contain, such as precipitation. Others were quick to report configuration difficulties and label the product "buggy." Some recent FS95 purchasers were unhappy at the prospect of shelling out the money for yet another version of the simulator.

The word was far from all bad, however. Several computer pilots praised the performance of FS98 used in conjunction with three-dimensional accelerator cards. Another noted that at a street price of less than \$50, FS98 is a bargain compared to some of its more realistic counterparts:

"I've flown many multimillion dollar 'full motion' simulators owned by the airlines and the military and have seen very few with graphics quality that approach what FS provides for about \$50 and none with the amount of coverage provided," this user pointed out. After flying a Class C 737 simulator at FlightSafety International's Seattle facility, I must agree—FS98's scenery is vastly more detailed than that provided by the complex main-frame powering the full-motion simulator.

Computer pilots understandably want a simulator to contain the airport nearest to their homes, and their favorite type of aircraft as well. It's true that FS98 doesn't contain every airport in the United States—let alone the world—but it comes closer than ever to that goal, providing 3,000 airfields, or ten times as many as FS95. (For more comments on FS98, see the review on page 27.)

Those who bought FS95 last year do have a point in their reluctance to join the "simulator of the year club," with Microsoft releasing a major new version annually. The company's rebate for previous version owners helps, but I'd like to see the company spend next year releasing upgrades, scenery packages and other FS98 enhancements, delaying the next official version until at least 1999. After all, FS4 remained best-selling software for years and boasted a wide array of add-ons. A number of firms have come to the fore with a variety of quality add-ons for FS5 and later versions, clearly showing a market exists.

FS98 was hardly the only development in the simulation world. Sierra released its long-awaited Pro Pilot simulator, and at press time, the sequel to the popular Flight Unlimited was just over the horizon. Naturally, debate raged on Usenet as to which program is superior.

The fact is, however, that while each program stands out in different ways over the other simulations, no single simulator—even FS98—excels in every category. For example, although FS98's graphics resemble in many ways those of FS5, it contains a vastly greater variety of cities and airports—a fact Microsoft is quick to point out.

So which one is best? The simple answer is, it depends. Computer pilots intending to buy only one of the three would be well advised to do some careful shopping and have a clear idea of what they're looking for. Those who can afford it might consider one Usenet poster's advice to buy each and enjoy the strengths of all. No other computer game has developed such a well-deserved following. Contact with these flight enthusiasts serves as a constant reminder of why we publish this magazine: To share the knowledge and fun of flight simulation with the millions of Flight Simulator fans. We at *Full Throttle* wish you long years of FS fun, and we hope you get a chance to apply your simulator skills to real-world flight. No matter how realistic Flight Simulator gets, it'll never surpass the real thing.

Best regards and happy holidays,

Gregory L. Harris

Gregory Harris
Full Throttle editor-in-chief

Abacus provides a Flight Simulator CoPilot

Abacus, a software company that manufactures add-ons for a number of computer entertainment programs, including Microsoft Flight Simulator, has released a CD-ROM-based product that provides a variety of navigational aids to FS5, FS95 and FS98. These navigational aids include a Global Positioning System for the Windows 95-based simulators.

CoPilot is a full-featured navigational aid for Flight Simulator. It interacts with Flight Simulator's scenery database files to produce maps, airport diagrams and instrument approach charts. A point-and-click interface lets pilots create instant flight plans. Since it reads scenery database files, charts are available for all types of scenery—default, add-on and shareware.

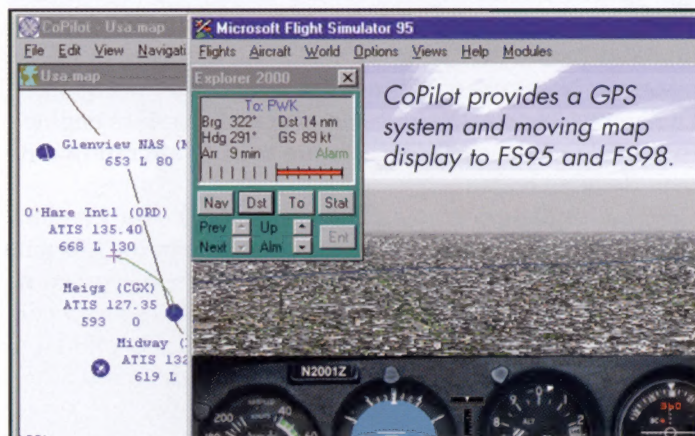
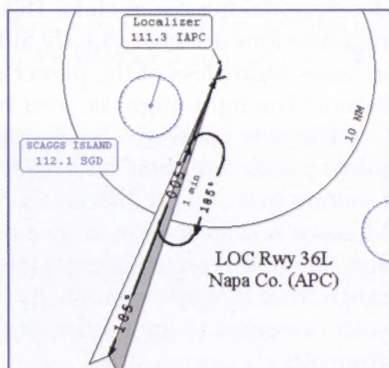
The software also provides FS95 and FS98 with a Global Positioning System, which tracks an aircraft's exact location to a high degree of precision. The display window lists the aircraft's position and speed; it also interacts with the pilot's flight plan to provide the bearing and distance to the next waypoint, as well as any deviation necessary to keep on course.

The software not only simplifies navigation, it also replaces commercial maps and approach charts. Computer pilots can generate their maps secure in the knowledge that the maps accurately reflect their Flight Simulator world. A free trial version of the CoPilot software is available for download from Abacus' Web page.

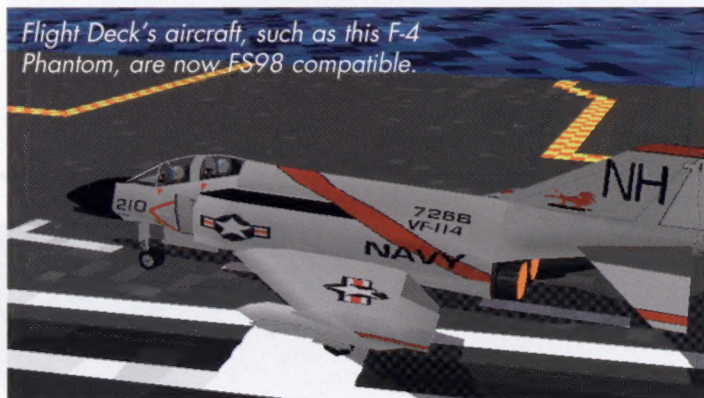
FS98 compatibility

Abacus also recently announced that it is providing FS98 support for several of its products. Among them are CoPilot, the Airport and Scenery Designer, its Around the World adventure package—in which pilots attempt to duplicate Amelia Erhardt's global flight attempt in a Lockheed Electra similar to hers—and the Flight Deck collection of carrier-based military aircraft.

CoPilot features instrument approach charts for any ILS system in Flight Simulator's database—even add-on scenery.



CoPilot provides a GPS system and moving map display to FS95 and FS98.



Flight Deck's aircraft, such as this F-4 Phantom, are now FS98 compatible.

CoPilot will support FS98's expanded Airport and Facilities Directory, and its GPS will work in that platform as well. The Airport and Scenery Designer will also support the directory and incorporate other improvements such as additional lighting systems, a new control tower and an object previewer. The aircraft in Flight Deck and Around the World will be FS98-compatible.

Abacus' Arnie Lee said that he expects FS98 to be a successful product and believes that its popularity will help third-party companies such as Abacus. "We aren't waiting to see if it will be successful—we're assuming it will be," Lee said. "So we're trying to keep ourselves in high gear to meet the demand of that marketplace."

CoPilot

List price: \$39.95

Abacus

Phone: (800) 451-4319

or (616) 698-0330

Internet: <http://www.abacuspub.com>

Sierra releases sequel to popular WWI simulation

Red Baron II

List price: \$54.95

Sierra On-Line

Phone: (800) 757-7707

or (206) 649-9800

Fax: (402) 393-3224

Internet: <http://www.sierra.com>

Dynamix, a subsidiary of the Sierra On-Line computer game company, has released a new version of its award-winning World War I aerial combat simulation Red Baron. Red Baron II, which was scheduled for release in November, uses the Windows 95 platform and Dynamix's 3Space 2.0 three-dimensional graphics engine to provide realistic models of more than 40 aircraft that fly over detailed terrain.

The simulation places pilots in the skies over London, Belgium, France and Germany in aircraft from the Moraine Bullet to the tri-winged Fokker D.I, noted as the personal aircraft of the dreaded "Red Baron" himself, Manfred von Richtofen. Like its predecessor, Red Baron II lets pilots customize the look of their aircraft—they can "paint" the fuselage and wings and apply unique insignia.

Pilots can engage in individual dogfights or sign on for a campaign that lasts the duration of the war. Skill levels are customizable to enhance playability for novices or add to the challenge for veteran pilots.



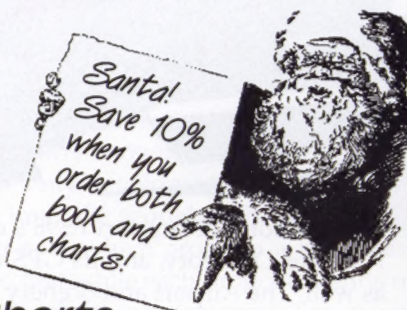
Red Baron II features detailed, texture-mapped aircraft and scenery.



Fly in formation via Internet- or network-based multiplayer missions.

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for fans of
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Flight Simulator
5.1, FS95 & FS98

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new features

Red Baron II includes an advanced artificial intelligence system that gives each object—such as enemy and allied planes, ground vehicles and anti-aircraft guns—its own decision-making parameters. This AI system ensures that no two missions are ever exactly alike and that battles occur in areas regardless of the player's presence—if a pilot lags behind, the fight might be over before he or she arrives.

The new software comes with a mission builder so pilots can design their own objectives and a randomizer function that creates different scenarios almost instantly. Missions now include more ground targets and more active—and dangerous—anti-aircraft artillery. Realistic sounds range from distant church bells (they warn enemies of your presence) to the unpleasant noise of bullets ripping your plane's canvas sides.

Interactive Magic releases advanced F-16 simulator

Interactive Magic, makers of a variety of computer simulation products, has released a flight simulation that lets computer pilots take the controls of the fly-by-wire F-16 Fighting Falcon. Developed by Digital Integration, which created the award-winning Apache attack helicopter simulation, the iF-16 program provides single- and multi-player combat using state-of-the-art graphics.

The F-16 simulation features a graphics engine that displays full-relief shaded terrain in 800x600 resolution and 256 colors. Like many Interactive Magic simulations, it features single missions, a campaign mode and a "quick start" function that lets pilots join an instant dogfight.

The program duplicates many F-16 systems, including the LANTIRN infrared targeting system and air and ground radars that can track multiple targets. A wide variety of air-to-air and air-to-ground weapons are available, including the advanced AIM-120 missile, "iron" bombs, laser-guided missiles and anti-runway munitions.

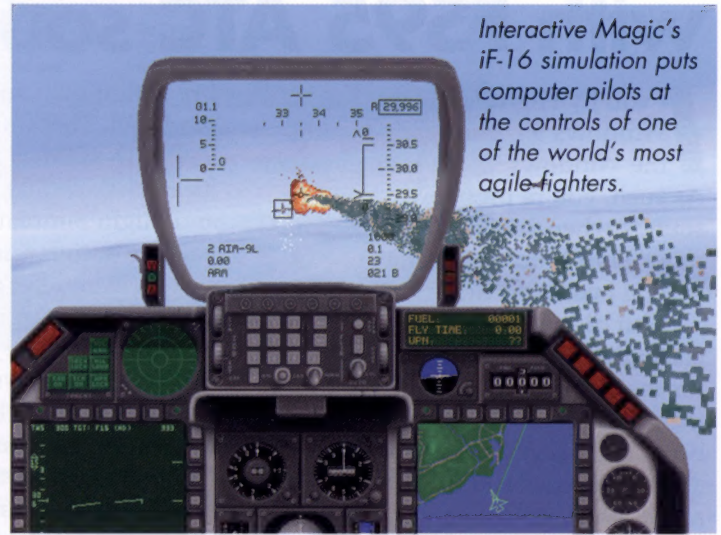
Players can join in cooperative or competitive combat via a two-way modem connection or as one of up to 16 participants via a network or the Internet. Pilots flying single missions aren't alone, though; they have full control over their wingmen.

patch available

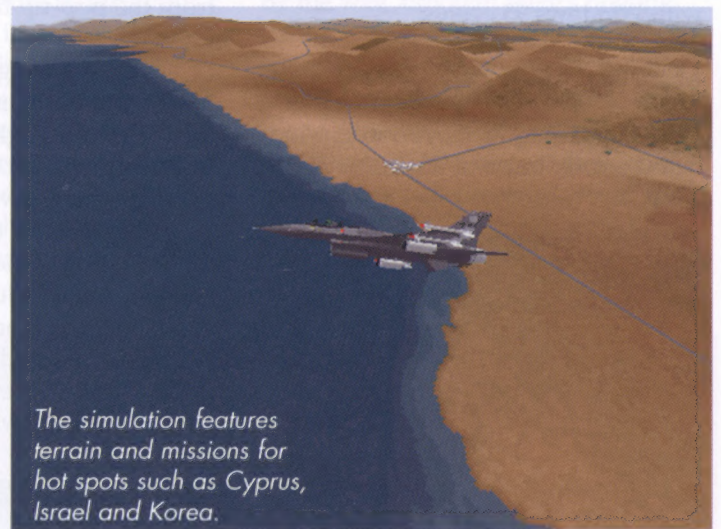
Interactive Magic has released a two-part patch for its popular iF-22 simulation of the high-tech Raptor fighter jet. The free patch, available on the company's Web site (<http://www.imagicgames.com/support.dir/patches.html>), makes a number of improvements to the game, including fixing a number of bugs.

Other enhancements include increased maneuverability of the AIM-120 missile, several sound fixes and a more realistic radar cross-section for the F-22. The game designers recommend that users not use the latter, however; although more realistic, it makes the plane so much more "stealthy" that enemies will rarely engage.

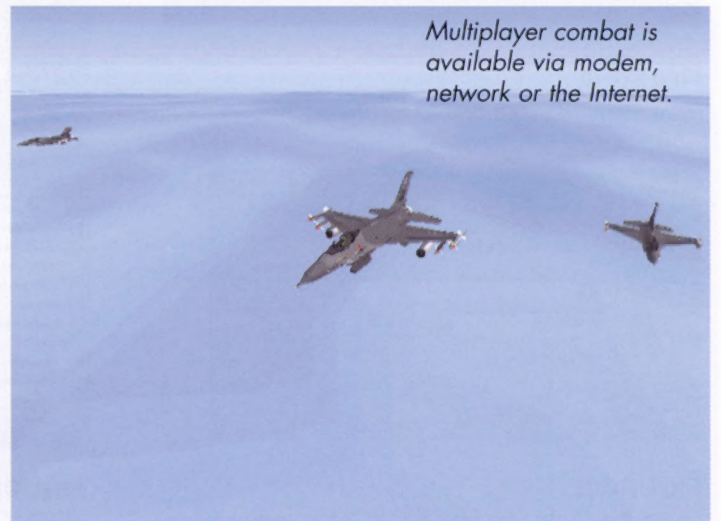
After installing the patch, iF-22 users will need to convert any saved games from the previous version. Computer pilots can also check Interactive Magic's patch page for updates to the firm's Apache, Hind and Air Warrior II simulations. ✈



Interactive Magic's iF-16 simulation puts computer pilots at the controls of one of the world's most agile fighters.



The simulation features terrain and missions for hot spots such as Cyprus, Israel and Korea.



Multiplayer combat is available via modem, network or the Internet.

iF-16

List price: \$49.95

Interactive Magic

Phone: (919) 461-0722

Internet: <http://www.imagicgames.com>

Configuring Windows 95 with FS95 ATC sounds

If you fly Flight Simulator for Windows 95, you're also using the Windows 95 operating system. As such, you're probably treated to sounds when you start up your computer, shut it down or when one of several events occurs.

But did you know that you can customize the sounds Windows 95 uses for these events? And did you know that the FS95 CD-ROM contains a number of sounds you can use to create an aviation-themed sound scheme? In this article, we'll show you where to find the sounds and how to associate them with Windows 95 events.

the technique

When installing FS95, you might have heard a brief burst of air traffic con-

trol communication as the Setup program ran. This sound is stored on the FS95 CD-ROM as a digitized sound file in WAV format. Since both Windows and Flight Simulator use this format, you can assign this file to a Windows system event. Let's see how it's done.

The first step in using a WAV file is knowing where it's located. Fortunately, the Windows Explorer provides a search feature that makes it easy to locate files. Launch the Windows Explorer, click on the Tools menu, select the Find command and then choose the Files or Folders... option from the pop-up list, as shown in **FIGURE A**.

In the resulting dialog box, type *.WAV into the Named text box and then select the Flight Simulator CD-ROM from the Look In dropdown list, as shown in **FIGURE B**. (Of course, the FS95 CD needs to be in the drive.) Make sure the Include subfolders check box is active. When you've finished, click Find Now.

There will be a brief delay while the Explorer

scans the CD-ROM. You can see the result of the search in **FIGURE C**. At the bottom of the list are a number of files that provide engine noises, tire screeches and the like to Flight Simulator, and a single file called RADIOCHA.WAV. This file contains the sound Setup uses. (There are also a large number of files in the ADV subdirectory not shown that provide voice communication for FS95's adventures.)

Double-click on the RADIOCHA.WAV sound in the search results window, and Windows 95 will play the sound. Now let's suppose that you've decided to assign this sound to play when Windows 95 starts up.

Your first step is to copy the file onto your hard drive (that way you won't need to keep the CD-ROM in the drive to hear the sound). You selected the file when you double-clicked it, so copying it is as simple as choosing the Copy command from the Edit menu. You can close the Find window at this point or minimize it if you want to explore some of FS95's other sounds.

Return to the Windows Explorer and navigate to your Windows directory.

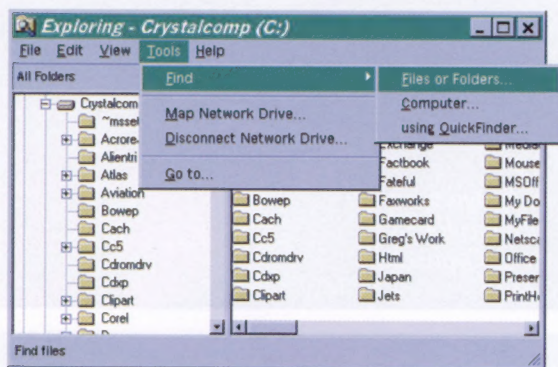


FIGURE A
Issue the Find command to locate the ATC WAV file.

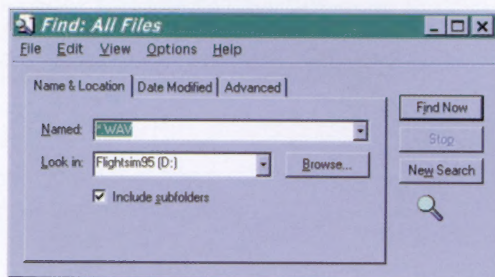


FIGURE B
Select the Flight Simulator CD-ROM to search it.

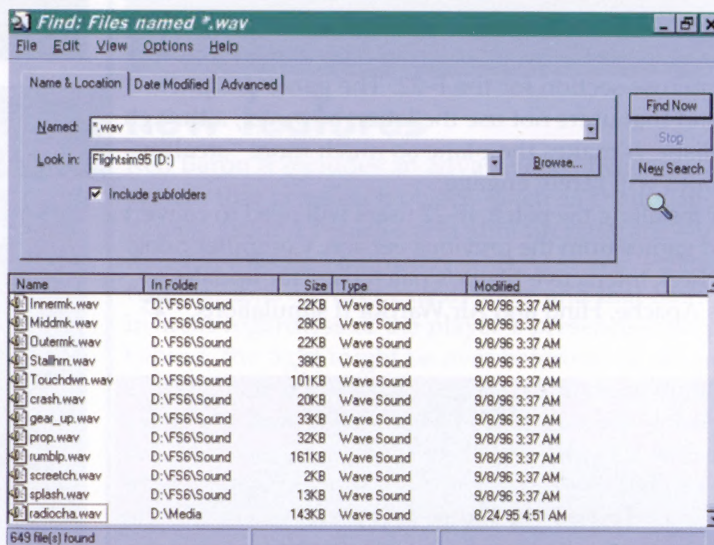


FIGURE C
The ATC file is at the end of the list.

Choose the Paste command from the Edit menu. The WAV file will appear in your Windows directory. At this point, you can close the Explorer and then launch the Control Panel to assign the sound to a system event. (The Control Panel is located under the Start menu's Settings category.)

In the Control Panel, double-click the Sounds icon. Scroll down to the Start Windows event, highlight it and then click Browse. In the resulting dialog box, navigate to your main Windows directory and then select the RADIOCHA.WAV file, as shown in **FIGURE D**. Click OK.

When you return to the Control Panel, you'll notice that the new sound now appears for the selected event. Click OK to confirm your selection and then close the Control Panel. The next time you start Windows 95, you'll be greeted by Air Traffic Control chatter—a perfect way to set the mood for an FS95 session.

what about 3.1?

If you use Windows 3.1, you can follow a similar procedure to assign sounds to events. All you need is a source for the WAV files. Fortunately, even if you don't have the FS95 CD-ROM, you have at least one of several options available.



FIGURE D
Assign the RADIOCHA.WAV file as your Windows 95 Startup sound.

For example, you can obtain a number of basic sounds from your FS5 SOUND subdirectory. These files include the prop and jet engine sounds and the crash noises. If you've installed Flight Shop's adventure factory, your hard drive contains its sound files in the ADVWAV subdirectory.

In addition, several Web pages and electronic information services such as America Online and CompuServe contain postings of sampled aircraft sounds. Although usually intended as replacements for Flight

simulator's default sounds, you can use them for Windows system sounds as well.

a caveat

By the way, although there's nothing wrong with assigning Flight Simulator sounds to events on your own computer, you shouldn't copy them onto a friend's machine—for example, one that doesn't run FS95—or post them on the Internet or a bulletin board system (BBS). The sound files are copyrighted by Microsoft and not for distribution. ✈

Trade your flight stick for a five iron

If you enjoy the detail and precision of Flight Simulator's controls, you may be looking for a greater challenge than you can find in today's popular point-and-shoot games.

Ever think of taking up golf?

Microsoft Golf 3.0, the latest version of the award-winning sports standard, requires many of the same skills as a good flight simulation run: attention to detail, an ability to read three-dimensional terrain and quick reflexes. But in Microsoft Golf, nobody's got you locked in their sights, and you can always click the Mulligan button if you really blow a shot.

how it works

Microsoft Golf's game play sounds deceptively simple—all you have to do is point in the direction you want the ball to go and then hold down and click your mouse button twice to gauge the power and snap of your swing. But this depiction is like saying all there is to the real-world sport of golf is hitting a little white ball until it falls in a hole.

For starters, the immediate act of controlling your swing through mouse clicks is much tougher than you might expect (you can cheat and add a pause in the process, but what's the fun in that?). Throw in necessary compensations for rolling greens, and you have a challenging gaming environment with a constant learning curve. And once you master the two built-in courses that come with Golf 3.0, you can choose between a wide variety of add-on modules, all based on actual golf links.

Fortunately, an extensive online Help library, complete with movie demonstrations of how to swing and aim, is always at hand. (With the relaxed pace of the game, the Help features flow nicely into the play environment.) For example, after a wild tee shot that put our ball in "the deep stuff," as the computer caddie put it, the window automatically popped open with an offer of advice. —Ken Hardin

Ordering info

Microsoft Golf 3.0 lists for \$44.95. You can download a demonstration copy of the program, along with a handful of patches and upgrades, from the Microsoft Web site at www.microsoft.com/sports/golf.

Our last flight in this area ended at Sanderson Airport, just northwest of Olympia and near the Hood Canal. Your destination is Fairchild International Airport in Port Angeles, on the shores of the Strait of Juan De Fuca, within sight of the Canadian border. And as an added challenge, there's a surprise waiting for you at your destination.

A straight-line course from Sanderson to Fairchild would be a simple 55-nautical-mile jaunt. However, there are good reasons to take a more round-about route.

Add the weather factor, and the routing decision rapidly becomes easier, although it results in a more complicated course. The forecast calls for ceilings around 3,000 feet MSL, with visibility of 15 miles or less.

The route marked on **FIGURE A's** map follows Route 101 the entire way. If you cut across a few corners where



the road bends out of the way, the total flight distance will be about 72 nm, which is just 17 nm longer than the straight line. Following the road will not only make navigation easier, but also give you a better chance of finding a suitable flat spot in the unlikely event of an emergency. And at a relatively high cruise speed of 130 knots, those extra miles will add less than eight minutes to your trip.

where are you?

Following the road simplifies navigation, but you'll still need to keep track of your location. There is no Special Use Airspace to contend with along the route, but you still should plan on some visual checkpoints to make certain that you stay on course and on schedule.

FIGURE B shows your flight log for this trip. The numbered checkpoints correspond with the points marked on the chart in **FIGURE A**.

The checkpoints are all based on distinctive geographical features that shouldn't be hard to spot. Because of the low ceiling, you won't be able to fly very high, which, combined with the limited visibility, means that you won't be able to see very far ahead, so pay close attention. You'll need to match quickly what you see on your chart with what you see out the window.

With the 3,000 foot ceiling, you don't have to worry about your cruising altitude conforming to the required altitudes for VFR flight; they don't apply within 3,000 feet of ground level. You'll want to stay below the clouds, but as high as possible, so a cruising altitude of 2,500 feet MSL should work well. Just don't let your altitude drift up, because the clouds can't measure accurately and may vary a bit from the forecast altitude.

Fairchild International, in spite of its impressive name, doesn't have a control tower, so you don't have to worry about getting a clearance to land there. You will need to plan to descend to pattern altitude—1,300 feet MSL—before you get within a couple miles of the field. At a standard 500 foot-per-minute descent rate, you'll want to start down about 2.5 minutes before

VFR Flight Log

Date: _____
 Departure: Sanderson (SHN)
 Destination: Fairchild International (CLM)

FIXES	ROUTE		ESTIMATED		ACTUAL TIME
	MAG COURSE	NAUT. MILES	GROUND SPEED KPH	TOTAL TIME	
1. Depart Sanderson, turn to follow Route 101, cruise climb to 2,500 feet	varies (1)		80	1 (2)	
2. Reach bend in Hood Canal.		6	130	5.5	
3. Pass inlet at Lilliwaup		13		8.5	
4. Pass peninsula in Hood Canal		27		15	
5. Reach end of west finger of Dabob Bay		37		20	
6. Road turns northeast; turn northwest to cut across bend		47		24.5	
7. Pass inlet.		57		29	
8. Reach edge of Port Angeles		69		34.5	
9. Arrive Fairchild International		72		36(2)	

(1) navigate by pilotage; headings vary
 (2) take-off and initial climb-out
 (3) plus 2 minutes to land

Sanderson Airport
 Coordinates: 046-14.01; 123-08.84
 Elevation: 269 MSL
 Pattern altitude: 1275 MSL
 Runway: 5-23 5,050 x 100 asphalt
 CTAF: 122.8

William R. Fairchild International
 Coordinates: 048-07.21; 123-29.28
 Elevation: 288 MSL
 Pattern altitude: 1300 MSL
 Runways: 13-31 3245 x 50; 8-26 6349 x 150
 CTAF: 123.0
 Notes: right traffic Runways 26 and 31

FIGURE B
 Follow the course charted in this flight log.

you get to the field, and at the 130 knot cruise speed, this distance is about 5.5 nm. As a result, you should probably start your descent after you pass the inlet, which is about 10 nm from the field.

emergency!

Now it's time for one aspect of this flight that'll require your imagination.

In general, Cross Country flights don't have any surprises, because it's hard to surprise someone when they get to read everything about the flight in advance. But we want to make an exception in this case.

You should plan your approach to the airport as if to enter the pattern for a right-downwind for Runway 26, which will be the one directly in front

of you as you approach. Right-hand traffic means you'll want to pass to the south side of the field, make a turn to the north to join the pattern, and make a normal landing. Except this time, you will pretend that things haven't gone completely smoothly.

Slow down as you approach the field from the east, and lower your landing gear in order to slow the plane's airspeed. Now here comes the imaginative part: Pretend that lowering the gear is draining the last bit of electrical power from your battery—you have just enough power left to announce on the CTAF (Common Traffic Advisory Frequency) that you have an emergency and are making a straight-in landing on Runway 26. (Or you can pretend that you're well-prepared, and you have a handheld transmitter with fresh batteries.)

So far it sounds simple enough—except that on the Cessna 182RG, the gear and the radios aren't the only equipment that relies on electrical power—so do the flaps. No electricity, no flaps.

So now you'll have to make your final approach to the airport with no flaps to slow you down. If you're too high and fast, pull the throttle back right away. If you're flying without Flight Simulator's Auto Coordination feature active, you can use a slip to lose airspeed and altitude.

Keep in mind that Fairchild has a 6,349-foot runway, so you have a

NOTAM:

This Cross Country flight is the last to be based on the default scenery for FS5.1; future flights will include airports from the default FS95 scenery. This fact means that FS5.1 users might need to add optional scenery or upgrade to FS95 or FS98 to be able to complete the flights.

lot of pavement to use once you get down. Also, your motor doesn't need the battery at all, so you can always do a go-around if necessary, but keep in mind that you don't know *why* you have an electrical problem, and the sooner you get on the ground where you can figure it out, the better.

Chances are probably good that you haven't practiced no-flaps landings lately, but the same ideas apply as a landing with flaps: Bleed off airspeed as you flare just over the runway until the airplane stops flying and lands. (Remember, Piper Cubs don't have flaps, so it must be possible to land without them.) Just don't come in too fast, and use the throttle, not the yoke, to adjust the descent rate.

getting ready to fly

There is no entry for Sanderson on the World Airports menu, so use the

Set Exact Location... command under the World menu. Enter the following values, as shown in **FIGURE C**:

North/South Lat.:	N47 13 51.4
East/West Lon.:	W123 9 24.7
Altitude (ft):	272
Heading (deg magnetic):	51

Next, you have to set the weather. Edit the cloud layers so that there is a single 7/8 broken layer from 3,001 feet to 4,002 feet with a deviation of 298 feet, as shown in **FIGURE D**. In the same dialog box, set the Visibility to 15 miles.

You'll be relying entirely on ground references so you can ignore your navigation radios.

At this point, you'll probably want to save the situation so you can repeat the flight later. We've provided such a situation on the December 1997/January 1998 Flight Bag disk; call (800) 223-8720 to order a copy.

So get ready for a round-about route ending with a small mechanical malfunction that's sure to get your pulse racing a little faster than usual. ✈

Alfred Poor is a licensed pilot and contributing editor for Full Throttle. He's also the author of the book Alfred Poor's Cross Country, published by Desktop Wings.

FIGURE C

Enter these values into the Set Exact Location dialog box.

FIGURE D

Set the clouds for a single layer.

14

Full Throttle? Where's the throttle?!

Only 17 months after receiving the Smithsonian's publications on flight, the Wright Brothers were at Kitty Hawk, North Carolina, successfully testing their first glider. Over the next three years, the Wrights developed their knowledge of flight and flying machines through the use of gliders. This knowledge led to the beginning (and ongoing) success of powered aircraft.

The Wrights' interest in soaring continued long after they achieved success and commercial gain in powered flight. Orville Wright set a soaring record of 9 minutes and 45 seconds that stood for more than ten years.

The principles of flight are the same today as they were then, and they apply equally to powered and unpowered flight. There's no limit to what one can learn, or the fun one can have, in a sailplane. Flight Simulator wisely includes a sailplane—the Schweizer 2-32, shown in **FIGURE A**—in order to provide a well-rounded aviation experience. In this article, I'll discuss Flight Simulator's sailplane and compare the principles to a recent flight I made at the controls of such an aircraft.

(Although we'll occasionally use the terms interchangeably, sailplanes are different from gliders. Unlike gliders, including the Wright Brothers' first model, sailplanes can ascend by entering rising columns of air.)



FIGURE A

The Schweizer sailplane is a popular glider.

"We knew that the Smithsonian had been interested in some work on the problem of flight, and accordingly, on the 30th of May 1899, my brother Wilbur wrote a letter to the Smithsonian inquiring about publications on the subject. Several days later we received a letter and several reprints of scientific papers concerning experiments in flight...After reading the pamphlets sent to us by the Smithsonian, we became highly enthusiastic with the idea of gliding as a sport."
—Orville Wright (right)

take off

Today's sailplanes are most commonly launched behind a tow plane—a stoutly powered, high-lift wing design aircraft that's specially equipped with a tow rope release. For example, the Louisville

Soaring Club uses a Piper Super Cub with a 180-horsepower engine. Some sailplanes can even be launched using an automobile or a ground winch and a 1,500 foot rope. Some gliders even feature a small, lightweight engine that's shut off once the plane reaches soaring altitude. No matter which launch mechanism is used, the sailplane pilot is in for a lot of fun once he or she reaches gliding altitude.

If you're being pulled by a tow plane, you'll notice that the glider's relatively large control surfaces respond quickly. As soon as the tow plane begins to roll, the sailplane's wings will come to level. (Sitting at rest, one wing touches the ground because of the single-wheel landing gear and long wingspan.) At about 30 miles per hour, the sailplane will lift off. (Sailplanes measure speed in miles per hour rather than knots.) You can see this sequence illustrated in **FIGURE B**.

At this point, precise pilot control is required to keep the aircraft steady a few feet above the ground. As the tow plane gains speed and begins to



FIGURE B

This sequence shows the sailplane taking off behind the tow plane.

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this experience so completely. Here, you'll find the broad strokes and the fine touches. You'll choose from

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a hangar of five civilian aircraft, ranging from the introductory Cessna 172 Skyhawk to the dual-throttled thrill of a Citation



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climb, the sailplane should fly a smooth duplicate of the tow plane's path, about ten feet below the tow plane. Airspeed during the climb is 60 mph.

At a predetermined altitude, the glider pilot releases the 200-foot tow rope and the sailplane breaks away to glide and seek lift. This altitude, which is established in advance by the sailplane pilot and the tow plane pilot, is typically 2,500 feet AGL for training gliders. Standard procedure calls for the glider to turn to the right after release.

Flight Simulator's launch procedure is a little different no matter which version you use. You can access a number of sailplane situations (or *flights* in FS95 and FS98) that place you near thermals or ridges, which you can use to gain altitude. (We'll discuss these

components in a moment. Also, these situations and flights use FS4-style, 16-color scenery.) To begin flying your sailplane in FS5, issue the Situations... command from the Options menu. In the resulting dialog box, choose one of the sailplane situations, shown in **FIGURE C**, and click OK.

The disadvantage of the situations is that they let you fly only in designated areas. However, you can use Flight Simulator's Slew feature to get airborne anywhere. To do so, first choose the Aircraft... command from the Options menu. (In FS95 and FS98, choose the Select Aircraft... command from the Aircraft menu.) Select the Schweizer sailplane from the aircraft list, as shown in **FIGURE D**. Click OK, and Flight Simulator will place you on the runway in the sailplane.

Now to gain altitude, begin by pressing the Y key to invoke Slew mode. Pressing [F4] makes you gain altitude rapidly; the Q and A keys make finer adjustments up or down, respectively. Press the [5] key on the numeric keypad to stop at the desired altitude and then Y again to leave Slew mode.

Be careful—since you began standing still, your aircraft will immediately pitch down. Let the sailplane gain airspeed and then bring the nose back up, just as if you were practicing stalls.

An alternative to this method is to get airborne in the Cessna and then effect a midair transfer by using the Aircraft... command to change the type of craft you're flying. This time you'll already have forward momentum, but your aircraft's flight characteristics will change and you should be prepared to react instantly.

basic maneuvers

Once you're in the air, sailplanes are a joy to fly. The cockpit is quiet and the controls docile. One of the first major differences you'll notice is the instrument panel, shown in **FIGURE E**. Unlike almost all other aircraft, the sailplane pilot refers to three main instruments, rather than six. Flight Simulator's sailplane also includes a compass. As we mentioned, the airspeed indicator registers in miles per hour rather than knots, and the vertical speed indicator utilizes a different mechanism (a *varometer*), which is extremely quick in providing accurate readings.

The instrument panel includes an altimeter. In real-world flight, you set the altimeter to 0 on the runway because the majority of sailplane flight is done out of and back to the same airfield. In Flight Simulator, you can use the altimeter just as you do for powered flights: On the runway, ensure that the altimeter is set at the actual field elevation. To do so, press B; Flight Simulator makes the adjustment for you.

Turning the sailplane is very smooth and predictable; however, the flight characteristics are different from the Cessna and take some familiarization. Due to the length of the wings, sailplanes have a tendency to overbank. The outside wing travels faster than the inside wing and, therefore, creates more lift. To compensate, make sure control input is smooth. Once you initiate the turn, reduce input a little sooner than you would in powered flight and let the aircraft's natural tendency keep the turn going.

Practice a series of 360-degree turns, keeping altitude as constant as possible. Also try some figure eights while keeping your airspeed constant at 59 mph. When you're in a thermal area, you'll want to maintain your L/D (lift over drag) speed of 59 mph through the lift area in order to maximize the effect of the lift. You might have to make some tight turns to stay within the thermal area; as with all aircraft, speed control is crucial.

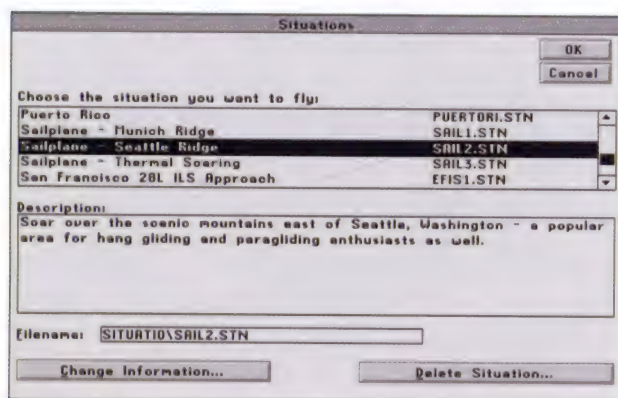


FIGURE C

FS5 provides a number of sailplane situations.

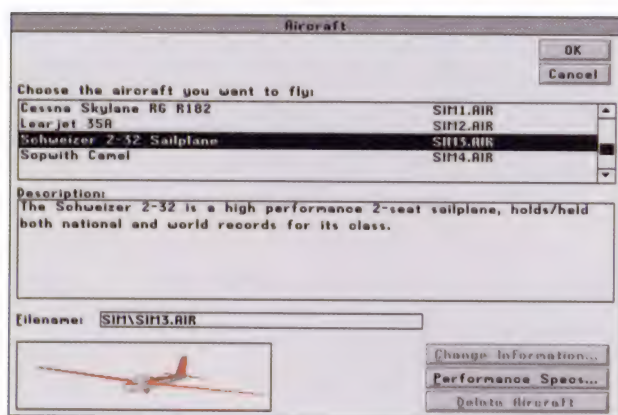


FIGURE D

You can select the Schweizer sailplane from the aircraft list.

stalls

Flight Simulator's Schweizer 2-32 behaves very well in stall situations. Take the glider up to 3,000 feet AGL by using the Slew method. When you exit Slew mode, descend slightly, gaining airspeed to approximately 75 mph. Ease the yoke back, and the airspeed will slow. Maintain the nose-high attitude, and the stall should be imminent (you won't hear the stall warning horn—sailplane flying is quiet).

Once the aircraft stalls, move the stick forward and allow a second or two for the plane to reestablish airspeed. Then, ease into level flight and maintain 60 mph airspeed.

Repeat this procedure, adding 15 degrees of coordinated turn as your confidence grows. Remember, the two major concerns in stall recovery are to keep altitude loss to a minimum and to prevent undue stress to the aircraft.

Performance sailplanes will lose altitude more quickly in a stall. And although the training models such as the one duplicated in Flight Simulator are very tame, it's still important to practice stall recovery. If get a little slow in the pattern as you try to stretch for a landing site, you'll suddenly have a low-altitude stall on your hands. In such a situation, you must keep altitude loss to a minimum. And remember, you can't apply full throttle to give yourself a boost!

landing

In actual landings, the sailplane is a lot of fun. In some important ways, it's a lot different than landing a powered plane. First, obviously, timing and runway setup are crucial—you can't simply add on more throttle in order to make the runway or power up for a go-around. The sailplane is only a few minutes from touching down when it is 1,000 feet or so above ground level. It's up to you to make the touch-down smooth.

Second, a powered aircraft normally cruises at relatively high speeds and then slows down as much as possible

for landing. In a sailplane, you do the opposite. In my recent flight, I maintained a cruise speed of 50 mph. But upon entering the pattern, procedure called for me to *increase* the sailplane's speed to 60 mph.

Third, when you're flying powered aircraft, you ease the yoke back when the plane's a few feet above the runway to flare. The sailplane doesn't require this maneuver.

Simply fly a slow and steady descent and remain as close to level as possible.

The rope break

In learning to fly powered aircraft, you'll be told many times that if you have engine failure on take-off, you should *not* look back. You may tend to think that you can glide back to the runway, but you can't. You will come up short.

In fact, a number of crashes occur because pilots violate the standard procedure, which is to find a field in front of you and proceed with an emergency landing. In a glider, "power failure" occurs only if the tow rope breaks. But unlike a powered aircraft, if you have 200 feet or more of altitude when the cable breaks, you *can* make the field.

In such an emergency, you'll make a 180-degree turn at about 45 degrees and land in the opposite direction of your take-off. During your pattern practice, you can try this maneuver by flying to 200 feet just past the end of the runway and making a sharp banking 180 degree turn for a very fast short final. Then, proceed with your standard landing procedures.



FIGURE E

The instrument panel is fairly simple—in both FS95 and the real thing.



FIGURE F

The sailplane touches down in a level attitude.

FIGURE F on the previous page shows our sailplane landing on its single central wheel.

One of the practical reasons for this different approach is the sailplane's configuration. The tail end and fuselage sit just a few inches off the ground; there's no room for a radical flare out. In addition, while powered aircraft use no more than 30 degrees of bank in the landing pattern, sailplanes can use up to 45 degrees of bank if the situation requires it.

Finally, the Schweizer 2-32 doesn't have conventional flaps. It does have dive brakes (in Flight Simulator, you activate them by pressing the slash [/] key). Dive brakes slow the aircraft without affecting its attitude. Located on the top and bottom of both wings, dive brakes are approximately three feet long and four inches wide—you can see them deployed in **FIGURE A**. When fully activated, they open to a position 90 degrees opposed to the wing's surface.

A glider's spoilers, like those on a Learjet, open only on the top of the wing. They reduce lift by interrupting the airflow over the top of the wing.

REMEMBER, in a sailplane, you don't just ease the throttle forward to taxi down the ramp—you get out and **push!**

Dive brakes have an opening surface on the top and bottom of the airfoil and reduce lift while slowing the aircraft. Some gliders have conventional-style flaps as well. On a properly sequenced landing, you'll activate the spoilers halfway through the downwind leg of your pattern.

In actual flight, the Schweizer is very calm and easy to control and touches down with a smooth roll. I noticed that my sailplane instructor was excellent at touching down on the same spot every time. Initially, I thought this accuracy was a point of

pride, but I later learned that the more accurate the touchdown and roll, the less physical effort required to get the aircraft in position to fly again. Remember, in a sailplane, you don't just ease the throttle forward to taxi down the ramp—you get out and push!

pattern practice

After my real-world sailplane jaunt, I couldn't wait to try it out in Flight Simulator. I used the World menu's Airports... command to drop into the Champaign-Urbana field. First, I flew a couple of wide patterns in the 182 just to get a few ground reference points. Then, I switched to the Schweizer.

At this point, we're going to deviate a little from standard procedure. Sailplanes require a grass strip, but we're going to cheat a bit and use the paved runway 32L in order to have a precise landing target. Slew up to 1,800 feet MSL (1046 AGL) and locate the airport. Establish yourself on a downwind leg for 32L at 1000 feet AGL and 65 mph. You'll need to fly a

big pattern in order to allow the plane to descend. I found it very easy to fly down the runway with 100 feet of altitude remaining and then have no way to get the aircraft down. It's simply a matter of re-learning the slow sink rate of the Schweizer. If you have too much altitude, you can add some S-turns to aid in your descent. Remember, there's no go-around option, which makes landing tricky!

On short final, make sure your wings are level and ease back *just a little bit* on the yoke. Allow the aircraft to fly smoothly onto the runway. If you

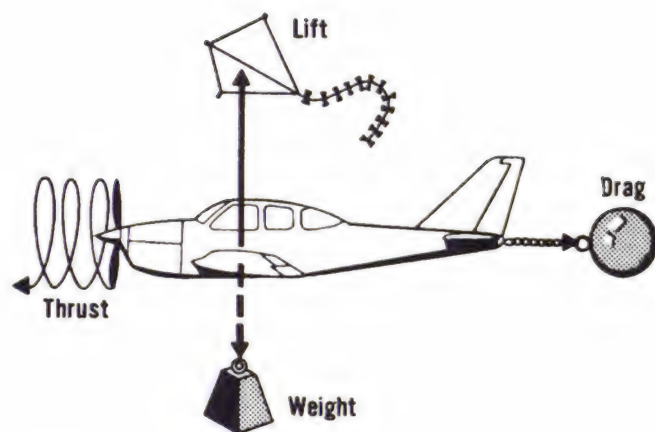


FIGURE G

Four aerodynamic forces act on gliders.

can sequence your pattern correctly the first time, I tip my goggles to you. I did fine in the real Schweizer, but in FS5, I had a terrible habit of flying down the runway. I recommend using all of the views Flight Simulator offers to better see your aircraft's position—press the S key to cycle among them. As always, effective speed control makes for successful landings.

finding lift

Understanding lift in a sailplane requires a quick review of the four aerodynamic forces acting on any aircraft—lift, weight (or gravity), thrust and drag, as shown in **FIGURE G**. Sailplanes generally have no inherent method of applying thrust, depending solely on a tow for their initial ascent. Once in free flight, sailplanes generally convert air-speed to altitude and vice versa.

Sailplanes will remain aloft for a significant amount of time (compared to a powered aircraft) simply because of their light weight, high-lift wings and streamlined design. In other words, the design maximizes lift and minimizes drag; weight remains a constant but is also kept to a minimum. Instead of thrust, sailplanes depend upon two external types of lift that can keep them aloft for extended flights. This lift comes from thermals and ridges.

A *thermal* is a rising mass of air created by a relatively hot patch of the earth's surface. As we mentioned earlier, you can find thermal soaring

near the San Francisco Coast by selecting the Thermal Soaring situation. Once you've selected the situation or flight, simply look for dark fields. Thermals are more likely over a dark field than a green field. When you find rising air, try to fly your best lift over drag speed (59 mph) and don't be afraid to perform a sharp bank or two to stay in the rising air.

Thermals are also common in the desert. Try slewing your sailplane to the Sahara and experimenting with thermal soaring there.

Ridge soaring comes from a constant wind blowing over a ridge, creating an upward airflow. FS5 has ridge soaring situations for the San Francisco area and FS95 contains flights for Munich and Seattle as well. When

ridge soaring, you can maximize lift by flying figure eights.

In actual flight, even in Kentucky where there isn't a great weather pattern for lift, a sailplane can stay aloft for three or four hours after a tow to 3,000 feet. Maximizing the aircraft's use of lift is a big part of the fun and also helps prolong the experience.

on final

Soaring is a great sport within aviation. If you've considered getting your private pilot's rating but have found yourself a bit low on cash, you may want to explore a glider rating. The minimum FAA requirements are ten hours of dual time (with an instructor), two hours of solo time—including ten launches and

landings—and three training flights for the check ride. A written exam is also required. Depending on your local soaring club's prices, you may find gliders to be an excellent and inexpensive entry into general aviation. Regardless of your long-term interest, I highly recommend a soaring adventure—fun is guaranteed! ✈

Tim Lampkin is a licensed pilot who recently took his first flight in a sailplane. He'd like to thank the Louisville Soaring Club based at Samuels Field in Bardstown, Ky., for the experience and say a special thanks to instructor David Knight and tow plane pilot Jerry Caudill for enduring a seemingly endless list of questions on one of the hottest days of the year.

NAVIGATION TECHNIQUE

Flying an ILS approach in FS95's 737

When flying light aircraft such as a Cessna, it's easy to rely on visual navigation. Small aircraft are relatively nimble, so the pilot can make quick corrections if the plane is off course. When flying the traffic pattern, for example, a pilot can rely solely on visual cues and not use the navigation instruments at all.

Jet aircraft are a different story. Since they travel much faster than props, they have a wider turn radius. And the larger the aircraft, the less maneuverable they tend to be. As a result, pilots of big jets, such as the Boeing 737 shown in **FIGURE A**, plan and execute their maneuvers well in advance. And they often rely on radio navigation, especially Instrument Landing Systems. Commercial aircraft must often align themselves with the runway before it's visible, even in the best weather conditions.

In this article, we'll describe how to practice landing the 737 using the ILS. We'll set up an easy straight-in approach to La Guardia's Runway 22, which is equipped with an ILS. In doing so, we'll take advantage of the 737's checklists found in FS95's Help system.

The technique works in both FS95 and the new FS98, which also has a Help system complete with aircraft checklists. FS5 doesn't come with a 737 as a default aircraft or a Help system. If you use FS5, we'll provide the information you need to fly an instrument approach using a Flight Shop 737.



FIGURE A

We'll fly a straight-in instrument approach in FS95's Boeing 737-400.

set it up

Although FS95 comes with several approach situations (called *flights*), it doesn't have one for La Guardia's Runway 22. It's easy to set one up, though.

Issue the Go To Airport... command from the World menu. In the resulting dialog box, select USA- New York from the Scenery Area dropdown list and La Guardia - Rwy

22 from the Airport list. Make sure that the Set Radio Frequency To New Location check box is active; when the dialog box resembles the one in **FIGURE B**, click OK.

Now, issue the Select Aircraft... command from the Aircraft menu and choose the 737. Issue the Time & Season command from the World menu and choose Dusk from the Time of Day dropdown list. Your NAV1 radio is preset to the ILS; set the OBS to 225 and then set the NAV2 radio to 113.1, the frequency for La Guardia's VOR. (You might need to press [Tab] to display your radio stack instead of the secondary engine instruments.) Finally, click the Nav lights indicator on the overhead instrument panel to activate your 737's running lights.

We'll use the Slew command to set ourselves up on a landing approach to this runway. First, dial in five degrees of flaps, apply full throttle and take off, rotating when you reach 151 knots. When you achieve a positive rate of climb, raise the gear and then raise the flaps as you accelerate through 190 knots.



FIGURE B

You'll begin from La Guardia's Runway 22 and then slew to landing position.



FIGURE C

We're set up on the ILS approach; we'll use the HSI (beneath the attitude indicator) to stay on the glide path.

Nice takeoff! Now press Y to activate Slew mode. Use the down arrow key on the numeric keypad to pull your aircraft backward. Keep an eye on the DME indicator; when you're about 11 miles from La Guardia, press Q to raise your altitude to 3,000 feet. Now press Y to leave Slew mode, reduce throttle to 55 percent and stabilize your aircraft at 190 knots between 10 and 11 miles from the field, as shown in **FIGURE C**.

At this point, you might want to save your current position as an FS95 flight. To do so, press the semicolon key (;) or issue the Save Flight... command from the Flights menu.

foxtrot sierra cleared to land

From this point, landing isn't very difficult. Let's take a look at the approach checklist in FS95's Help system to prepare ourselves. (If you haven't already done so, press P to pause the simulator while you review the checklist.)

Issue the Contents command from the Help menu. When the Help dialog box appears, click Airplane Handbooks and then Boeing 737-400. Choose Descent/Approach Checklist, as shown in **FIGURE D**.

You can see the checklist in **FIGURE E**. Its main value is that it gives us a guide for the various flaps settings. During our approach, we'll smoothly reduce our airspeed and add flaps while maintaining roughly the same power setting, making small adjustments as necessary to stay on the glide slope.

We're beginning at 3,000 feet and about five miles from the outer marker. Start by dialing in one degree of flaps (press [F7]) and ease through a smooth thousand-foot descent. Your goal is to reach the outer marker at 2,000 feet AGL. (Since Runway 22 is nearly at sea level, AGL and MSL are practically interchangeable in this case.)

When you hit the outer marker (at about 5.7 miles from the field), you'll hear a tone and a blue light will illuminate on your instrument panel, as shown in **FIGURE F**. You

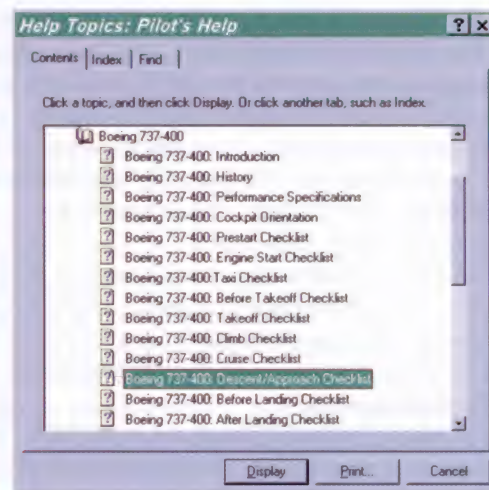


FIGURE D

Choose the 737's Descent/Approach Checklist.

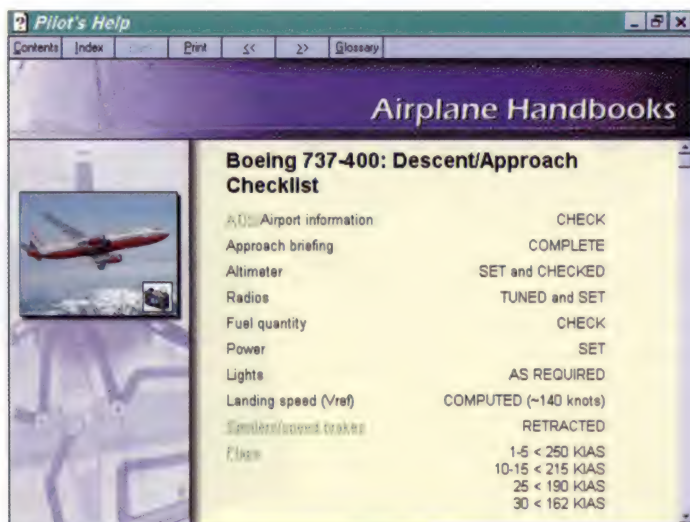


FIGURE E

The checklist will guide you down to the ground.

should see that the glide slope indicator on the right of the Horizontal Situation Indicator is active. Reduce speed to about 150 knots, dial in 15 degrees of flaps and lower the gear. You might need to increase power to maintain a smooth 700-foot-per-minute descent; keep the power setting between 55 and 65 percent.

At this point, you'll be able to see the runway; however, the instrument panel might obscure the view. If so, press W to expand the View 1 window to full screen. Press W occasionally to return the window to normal size and refer to your instruments. Although the instruments are valuable, pilots still rely on the Mark 1 eyeball to confirm their approaches.

From this point on, make small corrections in your heading and power to keep the localizer and glide slope on your horizontal situation indicator centered. When you've centered the glide slope, drop 30 degrees of flaps and slow to 140 knots.

As you approach the runway, you can even use the Visual Approach Slope Indicator, shown in **FIGURE B**, to guide yourself down without relying on your instruments. Remember, if the VASI shows a red light over a white light, as shown in **FIGURE G**, you're on the proper glide slope; white over white is too high and red over red is too low—add power!

Above all, be patient. Since we started perfectly aligned with the runway, you shouldn't need to make much side-to-side correction. Small corrections are the key. Maintain the proper airspeed and use the throttle to adjust your descent rate. FS95's 737 is harder to land than the real thing, but it can be done!

touchdown

At 50 feet above the runway, reduce power to idle. You won't flare; your 737 is already in a nose-high attitude. Just fly the aircraft down. When you hear the wheels touch, apply the brakes and then press [F2] to engage the thrust reversers. Disengage them as you slow to 60 knots, but keep applying the brakes until you reach a standstill. Congratulations! Your passengers thank you for a smooth and safe landing. ✈️



FIGURE F

At the outer marker, you should be roughly 2,000 feet up at about 160 knots.



FIGURE G

You can use the VASI to guide the final stages of your descent.

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Microsoft debuts FS98 in style

Microsoft Corporation's unveiling of Flight Simulator 98 established new precedents of detail, scenery scope and realism. It also reached new heights of excitement as the company hosted a two-day media event that introduced the simulator to computer pilots and journalists.

Although Microsoft has never before hosted such a large-scale public celebration for a new Flight Simulator version, company officials said that FS98's quality, coupled with the fact that the debut coincides with the fifteenth anniversary of the program's first Microsoft release, was ample cause to celebrate. Flight Simulator is perennially one of Microsoft's best-selling entertainment titles, having sold more than 10 million copies in its various versions and garnering numerous awards including *PC World* magazine's "Best Entertainment CD-ROM" of 1997.

The unveiling festivities consisted of a pair of one-day seminars held at the Museum of Flight at Seattle's Boeing Field. After an opening series of presentations by representatives from Microsoft and its FS98 partners, attendees conducted sample flights that demonstrated the simulator's capabilities. Among those on hand to instruct simulation novices was aerobatic champion Patty Wagstaff, whose Extra 300S stunt plane is modeled in both FS95 and FS98.

Wagstaff also instructs new Flight Simulator users through a series of videos contained on the CD-ROM, such as the one shown in **FIGURE A**. She said she enjoys watching simulation newcomers learn about flight through the program. "I think it's an amazing educational tool," she said.



FIGURE A

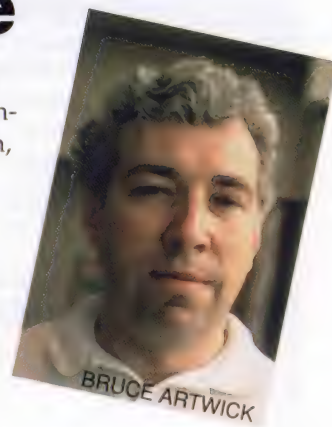
Champion aerobatic pilot Patty Wagstaff helped attendees fly a model of her Extra 300S stunt plane—and helps FS98 users through a series of computer-based videos.

Wagstaff said she sometimes watches as people try out the simulation of her plane. If they crash, she taps them on the shoulder and reminds them that real-world planes are costlier than their FS98 counterparts.

"You owe me 250 grand," she recalled telling them. Wagstaff went on to admit that along with the challenge of flying perfectly, FS98 also lets pilots experiment in perfect safety, which tempts some to try maneuvers which they'd normally think were too risky.

"I crash my Extra all the time," she said.

Besides the Extra, attendees had a chance to take off and land in the Boeing 737, including an instrument approach to La Guardia's Runway 22. We describe how to re-create this flight in FS95 or FS98 in the article "Flying an ILS Approach in FS95's 737," on page 21.



event highlights

The presentation also included Flight Simulator designers from Bruce Artwick, who created the original version of Flight Simulator for the Apple II in 1979. Artwick said he never expected the program to generate the enthusiastic worldwide following it has.

"It's something I've never expected," he said. "There's a whole phenomenon throughout the world." Flight Simulator users hail from the United States, Germany, Japan, Spain, Holland, Italy, Brazil and many other nations.

Microsoft designer Paul Donlan gave the assembled crowd an idea of how much the program has grown between the 5.1 CD-ROM version and FS98. FS 5.1 contains 25 MB of scenery information, while FS98 boasts ten times as much. And while Donlan described the many new cities in FS98, he received the most applause when he mentioned the airport that has been a Flight Simulator feature from the beginning.

"Of course, Meigs Field—we will never close it," he said, referring to uncertainty over the Chicago airport's fate over the past months.

Meigs Field isn't the only element FS98 has in common with early versions of Flight Simulator. Artwick said he was surprised when looking over the software's instructions to find that code he had written remains a part of the program.

"There are lines of code that are in there that were in there from day one," he said.

Also on hand were representatives from Cessna and Learjet, which validated the flight models of FS98's version

of their aircraft. Cessna's Jan McIntyre said that many computer pilots go on to get their licenses after their first taste flying in Flight Simulator.

"For thousands upon thousands of people, Flight Simulator is a first entree to flying," she said.

Learjet's Mark Stern noted that the Learjet 45 depicted in FS98—which will be available to computer pilots before their real-world counterparts take delivery of the actual model—is the first aircraft using completely new designs "from nose to tail" for the company in 30 years. He also described how the FS98 box photo was derived from a scale model rather than an actual jet.

The journalists and computer pilots attending the first day's conference also got a surprise bonus. The Microsoft team interrupted their presentation so all could witness the Navy's Blue Angels aerobatic team taking off. The six F-18 jets, leaving Boeing Field after an unrelated event, treated spectators to a full-afterburner formation blastoff.

FIGURE B shows a group of Blue Angels in formation. Microsoft has posted a video of the takeoff on its Web page (<http://www.microsoft.com/games/fsim>); we've promised to post an AVI-format video of another formation of F-18s taking off on our Web page (<http://www.cobb.com/fth>).

check rides

The presentation and FS98 flights were only part of the day's events. During breaks, the crowds could step outside to visit the museum's many exhibits, including a Boeing 707 that had served as Air Force One.

Microsoft had also arranged for attendees to take rides in a real Bell helicopter and Learjet 31A, shown in **FIGURE C**. Although the FS98 jet provides a highly accurate flight model, no PC-based simulation can convey the sensation of sitting in the Lear's cabin and rocketing up to 20,000 feet over Puget Sound.

The ascent was rapid, but the pilot later apologized—she explained that the flight wasn't cleared to flight level 20 right away, or she'd have been up there even sooner. Passengers noted that when cruising at more than 450 knots, the motion of the ailerons is barely perceptible even when the aircraft makes wide turns.

After landing, groups of attendees visited the Seattle offices of Flight-Safety International, which worked with Microsoft to authenticate both FS95 and FS98. There, some of the visitors could repeat their earlier La Guardia 737 flights, as shown in **FIGURE D**, while others



FIGURE B

An unexpected bonus at the presentation was an unrelated takeoff by the Navy's crack Blue Angels team.



FIGURE C

Attendees took in the Pacific Northwest scenery from 20,000 feet in a Learjet 31A.



PHOTOS COURTESY LEARJET

Microsoft Flight Simulator 95

Flights Aircraft World Option

FIGURE D

After attempting to land FS98's 737 at La Guardia's Runway 22, several attendees tried the same task in one of FlightSafety International's full-scale simulators.



PHOTO COURTESY BOEING



guided a 767 to safe landings despite bad weather, engine failures and other hazards.

Several observed that the full-scale simulator was actually easier to fly than FS98 due to the immersive nature of the experience. Of course, FS98 pilots don't have to know what each of the hundreds of switches and knobs in the 737 cockpit mock-up do.

The excitement Microsoft displayed over its FS98 release is already being reflected in the media. For example, *Computer & Net Player* magazine has touted FS98 as "the most significant upgrade to flight simulation ever." Now that FS98 is on store shelves, it's likely that computer pilots will respond with similar enthusiasm. ✈

Flight Simulator trivia

Did you know that early versions of Microsoft Flight Simulator served as benchmarks for some of the first IBM PC clones? A PC wasn't considered fully IBM-compatible unless it was able to run Flight Simulator. Designer Bruce Artwick even worked with Compaq Computer Co. to help that firm develop the first PC clone, using Flight Simulator to help identify BIOS problems such as interrupt handling.

FLY BYS

FS98 takes simulation to the next level

When Microsoft Flight Simulator 98 hit store shelves not long ago, it set new standards for realism and playability in the PC aviation arena. The new version not only continues the expansion of the Flight Simulator world begun with FS95, but also incorporates new technologies that fully integrate the software with the Windows 95 platform's capabilities.

FS98 expands on the aircraft and scenery offered in FS5 and even FS95. In fact, the new version contains ten times the airports of its previous incarnation. In this article, we'll describe the advances FS98 offers to serious simulation pilots.

preflight inspection

You don't even need to fly FS98 to see the improvements. The programmers jazzed up the installation routine; as it copies files to your hard drive, the FS98 Setup program whets your appetite with previews of the simulator and displays its progress with a clever airspeed indicator-style gauge, as shown in **FIGURE A**.

A word on the installation process—FS98's complexity means that it

also demands more of your hard drive than ever before. Be prepared to devote at least 100 MB of disk space for a typical install; copying all FS98 files to your hard drive greatly improves performance, but at a cost of about 425 MB—no small amount even on a 1 GB drive!

FS98 also requires that you install the latest version of the DirectX game driver, 5.0. The installation program gives you the option of installing it or using a current install of version 5.0.

destination unknown

Microsoft's slogan is "Where do you want to go today?" Nowhere is that slogan more fully realized than in FS98. FS98 expands on the increased amount of scenery FS95 offers, containing ten times as many airports. Here's a roundup of how the Flight Simulator world has grown in the new version:

➔ 3,000 airports, most of them making their Flight Simulator debut. Several cities—including The Cobb Groups's home, Louisville—now sport more than one airport. As you can see in **FIGURE B**, Bowman Field—



FIGURE A

FS98's improvements are obvious even during installation, as an airspeed indicator displays the progress.

Louisville's general aviation airport—now appears along with the Louisville International Airport also featured in FS95.

- ✈ More than 45 detailed cities worldwide, including Athens, Tokyo, Washington, D.C., Atlanta, and a photorealistic Las Vegas and Hong Kong, shown in **FIGURE C**. Designers added 20 new cities to the United States alone.
- ✈ Improved textures now appear on all standard mountains.
- ✈ An additional 10,000 objects added to the North American scenery, including water towers, radio antennas, oil storage tanks and other obstacles, whose placement is based on governmental navigation data.

The additional scenery doesn't mean additional complexity, though. Rather than having to hunt for all the airports in Slew mode, pilots can simply choose an airport from the World menu's Facilities Directory, shown in **FIGURE D**. The directory provides the location coordinates of airports, as well as radio frequency information. (One slight discrepancy with realism—the recently renamed Louisville International Airport still appears under its former name, Standiford Field. But we like the old name better, anyway.) You can also use the World menu's Go to Airport... command, which now provides a search engine that lets you select any airport in the database.

What does all this scenery mean? Besides the simply larger number of choices, it results in a greater probability that computer pilots can take off from an airport close to home. While FS98 hasn't reached the goal of providing every airport in the United States—let alone the world—its progress toward that goal seems to be exponential.

If FS98 users don't notice one big improvement to the software, it will have served its purpose exactly. The designers used new multithreaded code that greatly improves access to

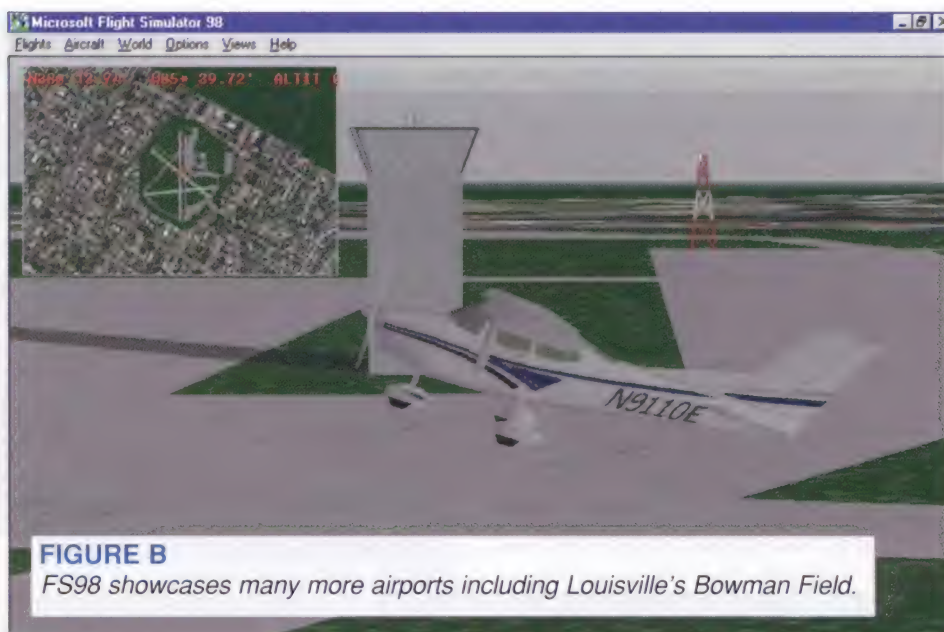


FIGURE B

FS98 showcases many more airports including Louisville's Bowman Field.

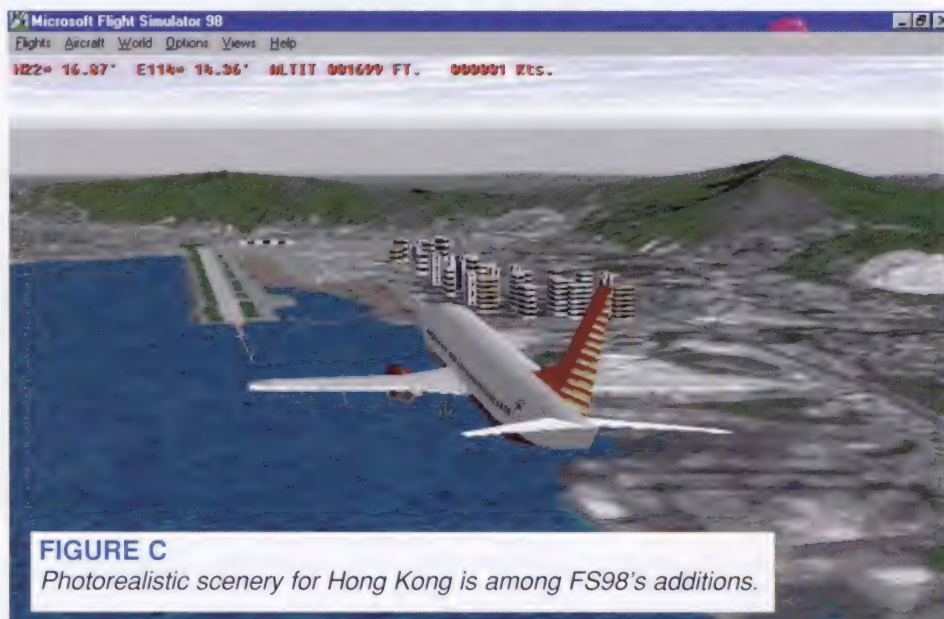


FIGURE C

Photorealistic scenery for Hong Kong is among FS98's additions.



FIGURE D

The Airport/Facility Directory makes it easy to find airfields.

FIGURE E

FS98 features a Cessna 182S with a flight model certified by Cessna.

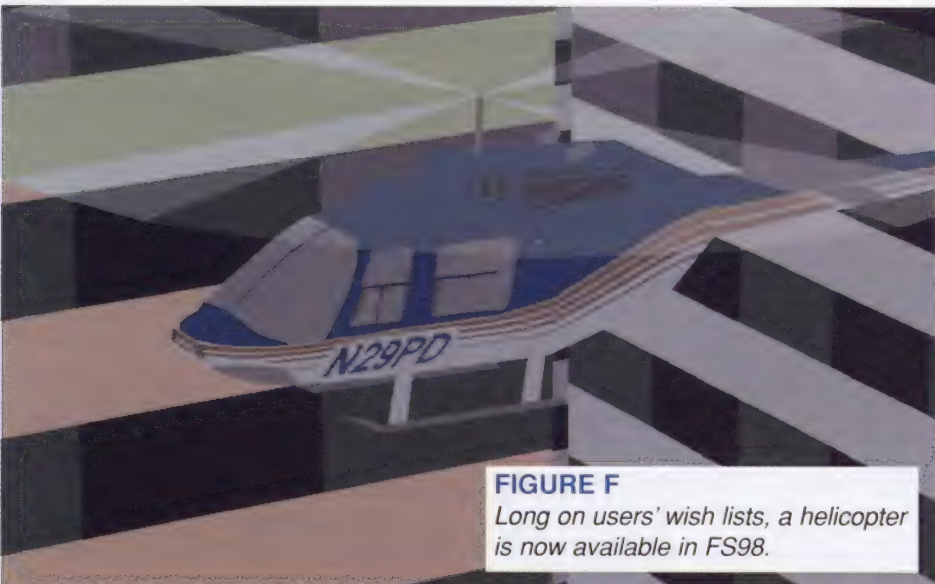


FIGURE F

Long on users' wish lists, a helicopter is now available in FS98.



FIGURE G

Users can fly from a three-dimensional virtual cockpit.

the CD-ROM-based scenery. Previous versions were notorious for pausing as the pilot approached dense scenery areas while the program loaded the data.

Another improvement is the manner in which FS98 displays distant textures. FS95 users sometimes complained that their computer's higher speed caused distant urban textures to *pixellate*—in other words, the black and white pixels would change position rapidly, resulting in a distracting appearance not unlike a television tuned to a dead channel. Thanks to a technique called *mip mapping*, this effect is greatly reduced. If your hardware doesn't support mip mapping, a software algorithm emulates this process.

In addition, the radio navigation system boasts a number of improvements. Previously, Flight Simulator gave pilots a break by letting them receive navigational beacons at long distances. Now VOR and ILS reception is realistically affected by the aircraft's altitude, the curvature of the virtual Earth, the distance from the station and the beacon's rated power.

a chopper in the hopper

Scenery isn't the only immediately obvious improvement to FS98. The program expands upon the aircraft FS95 offers to add models of real-world aircraft only now coming off the production line. Among them are the new fixed-gear Cessna 182S, shown in **FIGURE E**, and, replacing the venerable Learjet 35, the new Learjet 45.

In fact, FS98 pilots had the opportunity to fly the latter before any real-world pilot other than Learjet's testing staff. And as we'll discuss in a moment, personnel from Learjet and Cessna have verified the flight models of the new aircraft,

Possibly the most exciting addition, though, is the much-anticipated Bell 206 JetRanger helicopter, shown in **FIGURE F**. Operating on a true rotary-wing flight model, the JetRanger provides an entirely new flight experience—including the challenge of landing on one of the several rooftop helipads the scenery provides.

But Microsoft didn't stop at adding new aircraft. There's a brand new view mode called the *virtual cockpit* in the new planes. It provides the closest possible simulation to actually being in a real aircraft. No longer are pilots restricted to nine possible view angles; instead, they can use the joystick control to look around inside a three-dimensional model of the cockpit, as shown in **FIGURE G**. This ability is especially handy when practicing pattern flying. One drawback, however, is that the instruments do not display in this mode.

The Boeing 737 and Patty Wagstaff's Extra 300S stunt plane featured in FS95 also return in the new version. However, we were a little disappointed to discover that the Sopwith Camel and sailplane remain unchanged from their FS5 visual models. With all the spectacular changes to FS98's aircraft, a new visual model for these veterans would have been nice.

new technologies

Flight Simulator 98 is designed to take advantage of state-of-the-art technology—so much so, that users with older computers might be tempted to buy a new machine just for running the program. One of the prime examples is FS98's use of Direct3D technology.

Direct3D communicates with hardware three-dimensional graphics accelerator cards. These cards assume the considerable burden of calculating how the virtual world's three dimensions appear on the two dimensions of the screen. As a result, your computer's CPU is free to calculate other factors, such as flight equations and scenery updates.

Direct3D requires a 3D accelerator card, but the result is significantly improved performance. Examples include frame rates between 30 and 50 frames per second, depending on scenery complexity. Naturally, we can't print a picture that shows this improvement, but you can check out a special AVI-format video from Microsoft by visiting *Full Throttle's* Web page (<http://www.cobb.com/fth>).

But display technology isn't the only improvement. FS98 supports force-feedback joysticks such as Microsoft's SideWinder Force Feedback Pro, shown in **FIGURE H**. These input devices give a realistic tactile sensation of the air resisting control movements and the airplane's tendency to return to level flight.

FIGURE H

FS98 supports force-feedback joysticks such as the SideWinder Force Feedback Pro.



ultra realism

Microsoft has taken great pains to improve the realism of FS98. In fact, they didn't simply rely on their designers to achieve this goal. Instead, they worked with engineers from the Cessna and Learjet companies. Both of these firms have taken the unprecedented step of endorsing the flight models of the Cessna 182S and the Learjet 45.

Microsoft also brought the experts at FlightSafety International on board to enhance the program's realism. FlightSafety is currently working under Microsoft license to develop add-on products for FS98.

And top stunt pilot Patty Wagstaff added her input to designers tweaking the flight model of her Extra 300S. Now the plane flies with even greater realism, based on Wagstaff's thousands of hours at the controls.

conclusion

By now it shouldn't be hard to tell that we're impressed with the new version of Flight Simulator. While of course it isn't perfect—some users are sure to be disappointed by the continued absence of a GPS system, which many real-world pilots rely upon—it does strike an excellent balance between realism and playability, and it provides comprehensive scenery coverage while still offering precise detail in many cities.

For FS5 users who haven't yet upgraded to a new version of Flight Simulator, the time has come to take advantage of the many new features FS98 offers. It's a no-lose proposition—third-party scenery and Flight Shop aircraft are still compatible with the new version (although, as with FS95, you'll need to run the aircraft through a special free converter to be released by Microsoft). And a \$10 rebate for previous Flight Simulator owners in the U.S. lessens the sticker shock associated with new, state-of-the-art entertainment software. ✈

Flight Simulator 98

List price: \$59.95

Microsoft Sales

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or (206) 936-8661

Internet: <http://www.microsoft.com/sales>

Surfing the Web for Flight Sim sites

No matter which version of Flight Simulator you use, expandability is one of its key features. FS5, FS95 and FS98 all offer the ability to install third-party and shareware aircraft and scenery. Since the debut of FS95, many aircraft designed for that platform have appeared, and those for FS5 are usable via a free converter from Microsoft.

The online community has been an excellent forum for the exchange of aircraft and scenery. Flourishing forums exist on CompuServe and America Online, in which users post their aircraft or scenery creations. But the Web has taken a leading role in making top-quality aircraft and scenery available for only the cost of connect time during the download.

As always, this column is your guide to some of the Web's most interesting Flight Simulator-related sites. This issue, we look at sites offering a bonanza of aircraft, scenery files, and more.

Cool Site of the Month

This issue's Cool Site of the Month goes to a page that, despite its humorous title, provides an abundance of aircraft and scenery files—as well as other useful downloads—organized in a clear-cut page that uses frames to their best advantage. Capt. Slug's Free Stuff for Microsoft Flight Simulator, shown in **FIGURE A**, offers aircraft designed by the page's creator and others.

Visitors can obtain the files by clicking on one of the icons shown on the left side of the page. For example, clicking on the airplane icon transports visitors to a frame that lets them choose between aircraft designed by Capt. Slug—from a Beechcraft Duchess in several color schemes to a flying pig (yes, a flying pig!)—and searching the

Indiana University of Pennsylvania's FTP site for other aircraft. The scenery page offers files for Midway Island and Atlanta International Airport, as well as graphic maps of those fields. Finally, the image's section provides a number of graphics other computer pilots could use in their own Web pages.

One other nice feature of this page is its handy basic flight tutorial. It provides novice pilots with illustrated advice on basic flight maneuvers and flying a loop, while for the advanced user, it reveals how computer pilots can create their own FS5 textures.

The FS5 Hangar

Chris Hadley, a 15-year-old Flight Simulator enthusiast from Sawbridge, England, has created a Web page devoted to Flight Simulator that offers a number of downloadable aircraft and scenery. According to his page's biographical information, Hadley is an Air Cadet with the United Kingdom's Air Training Corps.

Hadley's page, shown in **FIGURE B**, is unique in that he said he created it using the Windows Notepad text editor, rather than page creation software. As such, it's an impressive reminder that HTML code is merely a text file that tells the browser what to display. His page uses frames and contains a number of subsidiary pages, including a message board, flight videos and photographs, simulator tips and of course aircraft and scenery files.

The aircraft page features mostly FS5 Flight Shop files from a British Airways ATR-72 to a OV-10D Bronco reconnaissance aircraft. Hadley's scenery page features a graphic map of the world; by clicking on an area of the map, users can download corresponding scenery files. 



FIGURE A

Capt. Slug's page lets users download aircraft, scenery, engine sounds, images and other files.

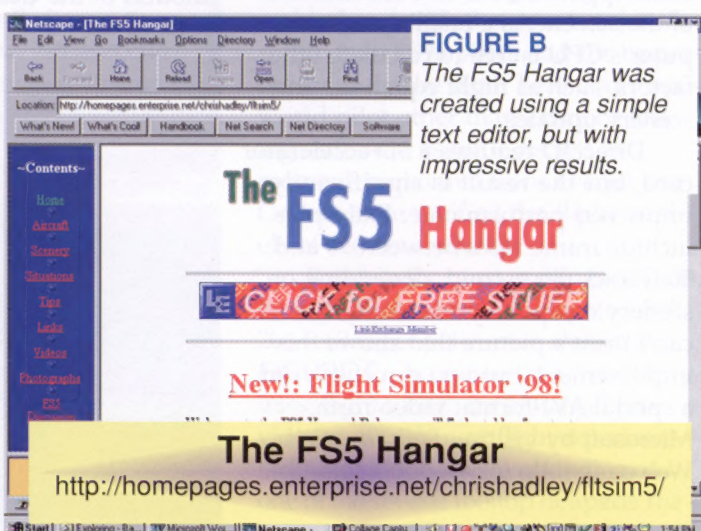
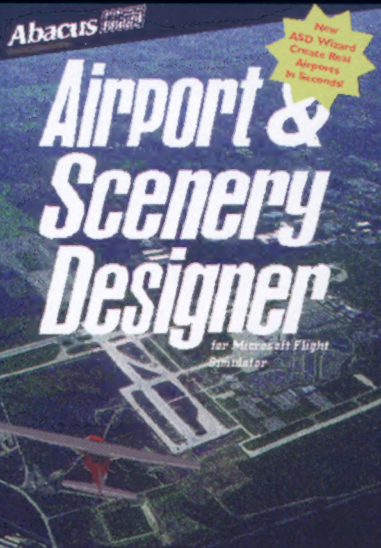


FIGURE B

The FS5 Hangar was created using a simple text editor, but with impressive results.

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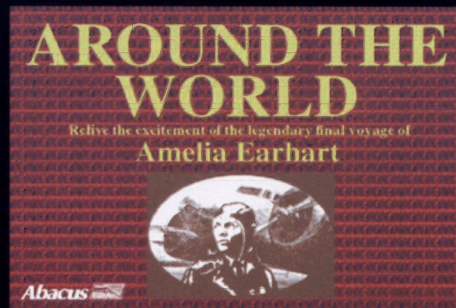
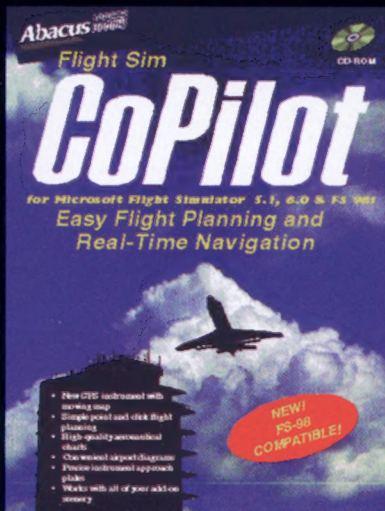
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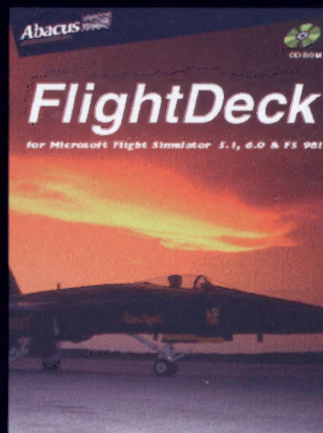


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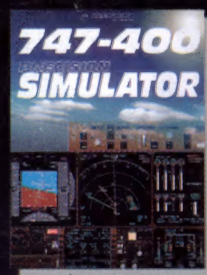
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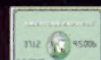
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